

Head Lice in Mummified Greenlanders from AD 1475

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On initial inspection of the corpses, lice and eggs of lice (nits) were found in the hair of some of the individuals and in a pair of sealskin pants not traceable to any specific individual.

This article briefly describes the results of a light and scanning electron microscopic study of these ectoparasitic findings. The main elements of the morphology have been described previously (Bresciani *et al.* 1983).

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Material and methods

The corpses, six women and two children, were thoroughly examined for parasites while temporarily kept at the National Museum and Gentofte Hospital (both in Copenhagen, Denmark).

A large number of dried-up lice and nits were found in the hairs of five of the corpses and in a pair of sealskin pants. However, the majority of the collected specimens were only fragments; and only three females, two males, a few juveniles, and eggs were in a state of conservation suitable for examination.

The lice materials were slowly rehydrated in a humidity chamber with a gradual increase of the relative humidity over a two-day period. Then they were submerged in distilled water for three days and processed for scanning electron microscopy (SEM) by fixation in 3% glutaraldehyde in 0.1 M cacodylate buffer (pH 7.4), post-fixed in 1% osmium tetroxide for 1 hour at 4°C, dehydrated in acetone, and critical-point-dried before gold covering. The material was observed in a JEOL IMS-T20 at 5 or 20 kV. Material for light microscopy was immersed in lactic acid for two days at 50°C before examination.

Results and discussion

As will be evident from Figures 1 and 2, the lice were fairly well preserved, possibly because of the dry, cold

conditions of the crevice where they were found. Thus, their morphological characteristics even allowed a taxonomical identification.

The human host may be infested by three kinds of lice, usually designated the head, body and pubic louse. The latter is a very distinct species and of a separate genus, whereas the two former are often regarded either as closely related species (Busvine 1978) or as subspecies of *Pediculus humanus* (Marshall 1981). The two species/subspecies have a vast number of morphological features in common, and their separation is often difficult. However, on the basis of a careful examination of distinguishing characteristics (antennae, paratergites, tibiae of middle legs, etc.), a systematic grouping can be made (Seguy 1944; Brinck 1950; Busvine 1978). The well-preserved structures of our specimens made such examination possible, and all specimens, both from heads and pants, could be regarded as head lice, *Pediculus humanus capitis*. This does not conflict with the localization in the pants, since head lice nowadays may occasionally be found outside the head hairs, e.g. in the pubic region and underwear, whereas body lice, on the other hand, are never found in the head.

In one of the corpses particularly many eggs were found, i.e. eggs on every three or four hairs. In the same mummy the abdomen of a louse was microscopically identified in the intestinal contents, suggesting that lice had been eaten. This habit was (possibly) not uncommon previously among Greenlanders (Fabricius 1780, cit. Hart Hansen *et al.* 1985).

Archaeological findings suggest that the louse had a world-wide distribution in ancient times. Adult lice

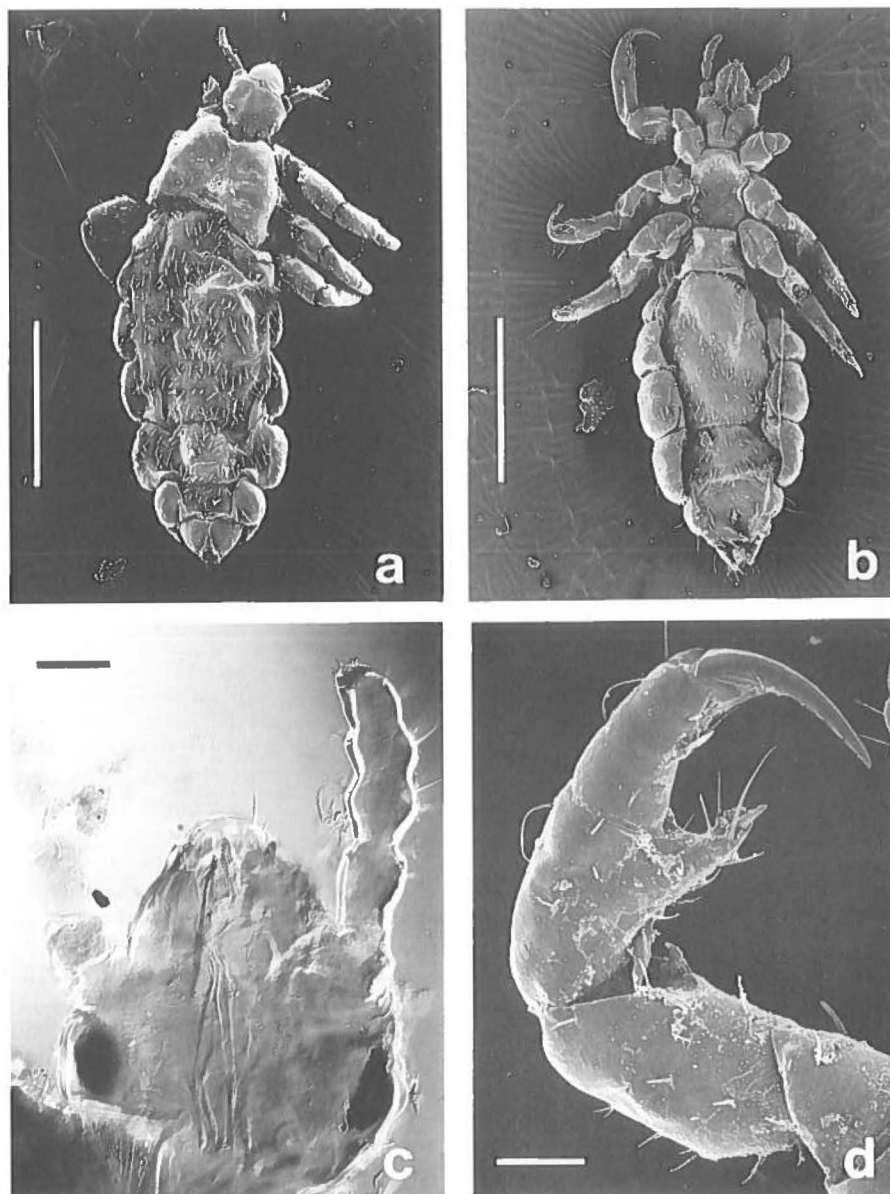
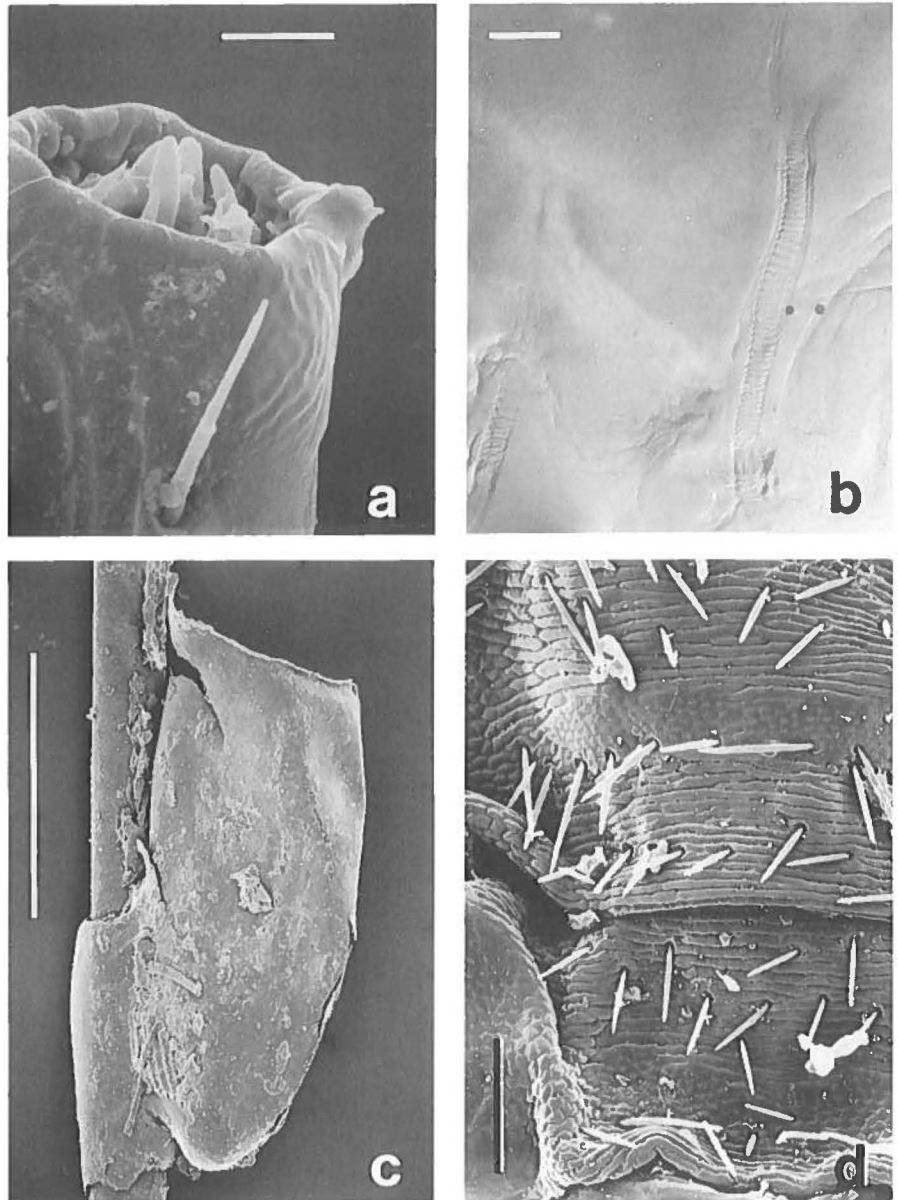


Fig. 1. *Pediculus humanus capitis* de Geer from mummified corpse of an Eskimo. a: dorsal side (♀), b: ventral side (♀), c: head with well-preserved antenna and eye, d: leg I (♂). Bar: 1 mm (a,b), 100 μm (c,d).

Table 1. Distinguishing characteristics of the head louse and the body louse (after Seguy 1944; Brinck 1950; Busvine 1978).

	Head louse (<i>P.h.capitis</i>)	Body louse (<i>P.h.humanus</i>)
Length of female	2.6–3.7 mm	3.3–4.2 mm
Antennae	Second last segment almost as long as broad	Second last segment somewhat longer than broad
Tibial length	0.29 mm	0.42 mm
Dorsal hairs on abdomen	Numerous and stout	Few and weak
Paratergites	Broad. Developed also intersegmentally	Narrow. Developed only laterally
Abdominal spiracles	Bud-shaped, diameter above 100 μm	Flat, diameter below 100 μm

Fig. 2. *Pediculus humanus capitis* de Geer from mummified corpse of an Eskimo. a: tip of antenna with sense organ, b: trachea, c: nit (egg) attached to the hair of the host, d: dorsal side of abdomen (♀). Bar 10 μm (a), 20 μm (b), 0.5 mm (c), and 100 μm (d).



have been identified in a pre-Columbian Peruvian mummy (Brothwell & Spearman 1963) and in coproliths from a paleo-Indian site in Utah, USA (Fry 1976). In more northerly regions lice have been identified in Aleutian mummies from about AD 1500–1600 (Horne 1979) and from a Norse settlement in Greenland where a body louse was found in a refuse heap of a farm (Sveinbjörnadóttir & Buckland 1982). The Vikings might have brought the lice with them from their European places of origin, since they had little contact with the Eskimos.

The good preservation of our specimens and the lice specimens from the studies cited may be seen in the

light either of very dry or very cold storage conditions, or both, at the excavation sites.

There are a number of well-known diseases which are transmitted by human lice. The most important is exanthematous typhus, caused by micro-organisms belonging to the *Rickettsiae*. This disease was previously quite common in temperate climate with high death rates, especially in crowded households with poor hygienic standards (Harwood & James 1979). The disease may have existed in prehistoric Greenland as well, and the possibility cannot be entirely excluded that it may have contributed in some way to the deaths in Qilakitsoq.

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